CLAIMS

What is claimed is:

1. A voice coil motor coupling structure of a hard disk drive for coupling a voice coil motor to a base plate of the hard disk drive, the voice coil motor including a coil coupled to a rear end portion of an actuator arm, an upper yoke and a lower yoke provided at upper and lower portions of the coil, respectively, separated at a predetermined distance from the coil, and a magnet attached to the lower surface of the upper yoke, the voice coil motor coupling structure comprising:

a countersink formed in the lower yoke;

a countersunk head screw inserted in the countersink and coupled to a screw coupling hole provided in the base plate to fix the lower yoke to the base plate;

boss insertion holes formed in each of the lower and upper yokes respectively at both end portions in a lengthwise direction;

bosses protruding from the base plate and inserted in the boss insertion holes ; and

screws inserted in the boss insertion holes and coupled to respective screw coupling holes provided at each boss, fixedly coupling the upper yoke to the lower yoke.

2. The voice coil motor coupling structure of claim 1, wherein the countersink is provided at a position corresponding to a neutral zone of the magnet.

3. The voice coil motor coupling structure of claim 1, wherein, when the countersunk head screw is inserted in the countersink, a head portion of the countersunk head screw does not protrude above the upper surface of the lower yoke.

4. The voice coil motor coupling structure of claim 1, wherein the height of each boss is greater than that of the lower yoke and less than a sum of the heights of the lower yoke and the upper yoke.

5. The voice coil motor coupling structure of claim 1, further comprising a first support portion protruding to a predetermined height and having a diameter greater than a lower end portion of the countersink and formed around the screw coupling hole provided in the base plate, and a plurality of second support portions, each protruding to a predetermined height and having a diameter greater than each of the boss insertion holes is formed around a lower portion of each boss, so that the first and second support portions support the lower yoke at a predetermined distance from the base plate.

6. The voice coil motor coupling structure of claim 5, wherein upper surfaces of the first and second support portions are flat and have the same height.

7. The voice coil motor coupling structure of claim 1, further comprising:
an actuator locking apparatus.

8. The voice coil motor coupling structure of claim 1, wherein the base plate is of a bowl type.

9. The voice coil motor coupling structure of claim 7, wherein the actuator locking apparatus comprises:
a metal piece installed at an end portion of the actuator arm;
a bending portion provided on the upper yoke;
a slot provided on the bending portion having a predetermined width; and
a contact portion provided on the lower yoke and bent such that an upper surface of the contact portion is lower than an upper surface of the lower yoke.

10. The voice coil motor coupling structure of claim 9, wherein a lower surface of the bending portion contacts with the contact portion.

11. The voice coil motor coupling structure of claim 9, further comprising:
a recess formed in the base plate, having a predetermined depth wherein the contact portion is inserted.

12. A method of coupling a voice coil motor to a base plate of a hard disk drive, comprising:

attaching a lower yoke of a voice coil motor to a base plate at a first point and a second point to prevent movement of the lower yoke relative to the base plate;

assembling an arm of the voice coil motor to a pivot shaft; and

coupling an upper yoke of the voice coil motor to the lower yoke of the voice coil motor.

13. The method of claim 12, wherein the attaching the lower yoke of the voice coil motor to the base plate, comprises:

inserting a countersunk head screw into a countersink formed at the first point in the lower yoke of the voice coil motor; and

coupling the countersunk head screw to a screw coupling hole at the first point.

14. The method of claim 12, wherein the coupling of the upper yoke of the voice coil motor to the lower yoke of the voice coil motor, comprises:

placing the upper yoke onto the lower yoke;

coupling screws into boss insertion holes at both ends of the upper yoke and the lower yoke; and

coupling the screws into screw coupling holes respectively provided in each boss on the base plate of the hard disk drive.

15. The method of claim 12, wherein the lower yoke is mounted on a boss at the second point.

16. The method of claim 12, wherein the attaching the lower yoke of the voice coil motor to the base plate at a first and a second point to prevent movement of the lower yoke relative to the base plate further comprises:

a third point at which the lower yoke is mounted on a boss.

17. A hard disk drive comprising:

a voice coil motor having a coil coupled to a rear end portion of an actuator arm;

an upper yoke and a lower yoke provided at upper and lower portions of the coil respectively, separated at a predetermined distance from the coil;

a magnet attached to the lower surface of the upper yoke; and

a bowl-type base plate having flattened structures at three points for fastening the lower yoke in a position relative to the bowl-type base plate prior to coupling the upper yoke to the lower yoke.

18. The hard disk drive of claim 17, wherein the lower yoke is mounted on a screw coupling hole at a first point and the lower yoke is mounted on a boss at each of a second and third point.